# Water Quality Data for the Delta, California Aqueduct and Delta-Mendota Canal

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MWQI/SWC Face-to-Face Meeting
July 2011

# Objectives

- Obtain water quality daily datasets from January 1990 to December 2010 for use in the DSM2 model of the California Aqueduct and Delta Mendota Canal and in the Sacramento-San Joaquin Delta.
- Estimate values for any missing data
- Report methods and results

# Introduction

- The Bay-Delta Office (BDO) uses DSM2 extension to make forecasts of water quality in the California Aqueduct and Delta-Mendota Canal and in the Sacramento-San Joaquin Delta.

- The Municipal Water Quality Investigations (MWQI) branch was asked to provide updated daily water quality data at inflow and DSM2 validation locations along the canals and in the Delta for the following constituents:

  - Salinity  (Electrical Conductivity - EC)
  - Dissolved Organic Carbon (DOC)
  - Bromide

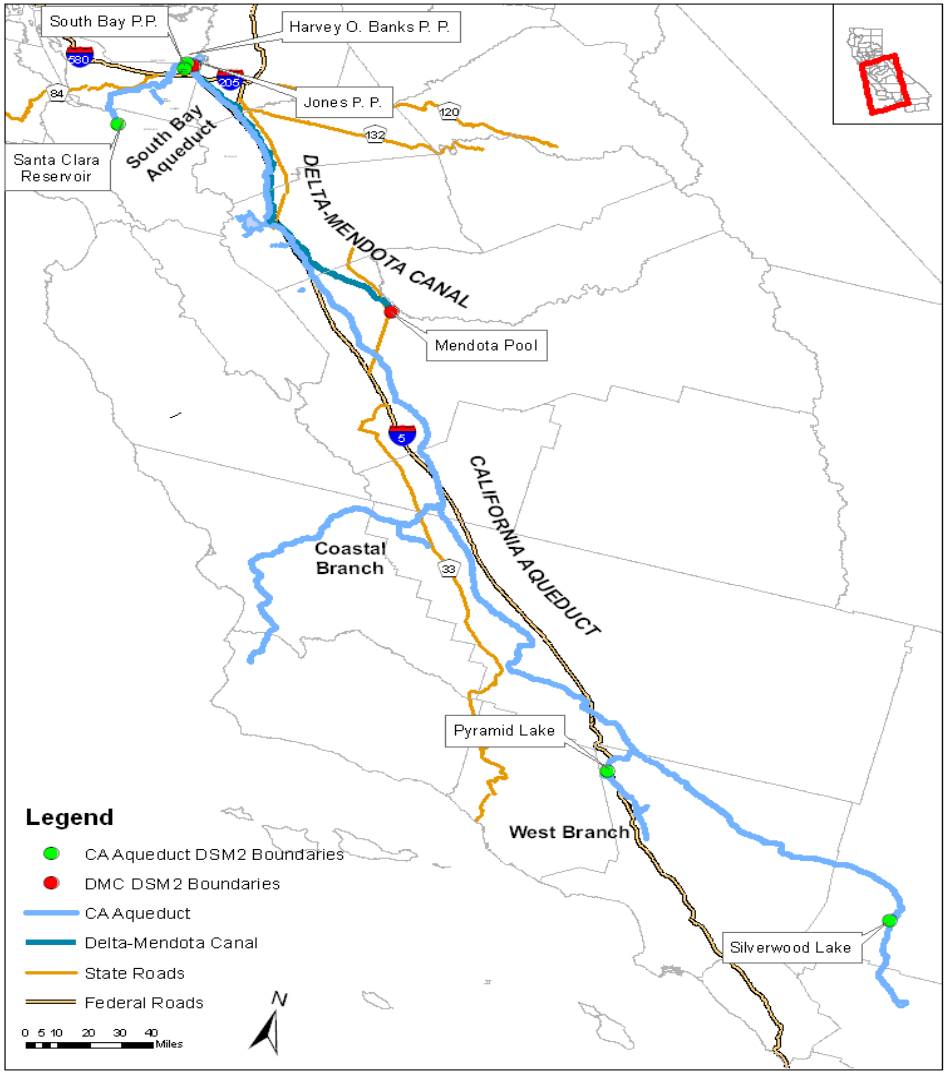
# Data Sources

- California Data Exchange Center (CDEC)
  - Real time hourly and daily data
- Water Data Library (WDL)
  - Intermittently collected grab samples
- U.S. Bureau of Reclamation (USBR)
  - Intermittently collected grab samples

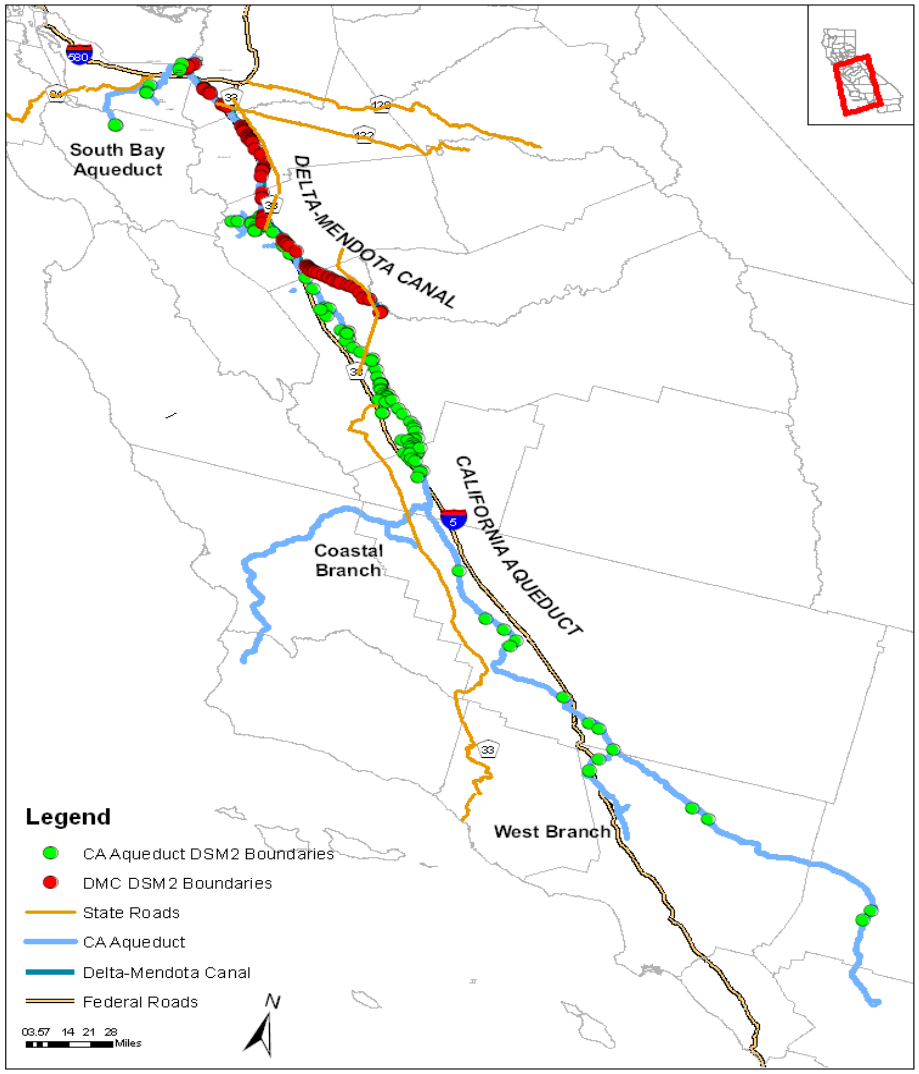
# Analytical Methods

- EC Methods
  - Real time hourly and daily data – Instrument sensor
  - Intermittently collected grab samples – Standard Methods 2510-B
- DOC
  - Real time hourly and daily data – Regression with UVA absorbance
  - Intermittently collected grab samples – EPA 415.1 & EPA 415.3
- Bromide
  - Real time hourly and daily data - Regression with EC
  - Intermittently collected grab samples – EPA 300.0

# Locations of Canals



# Salinity Data Locations




**Number of Data Locations**

CA Aqueduct – 142

DMC - 59

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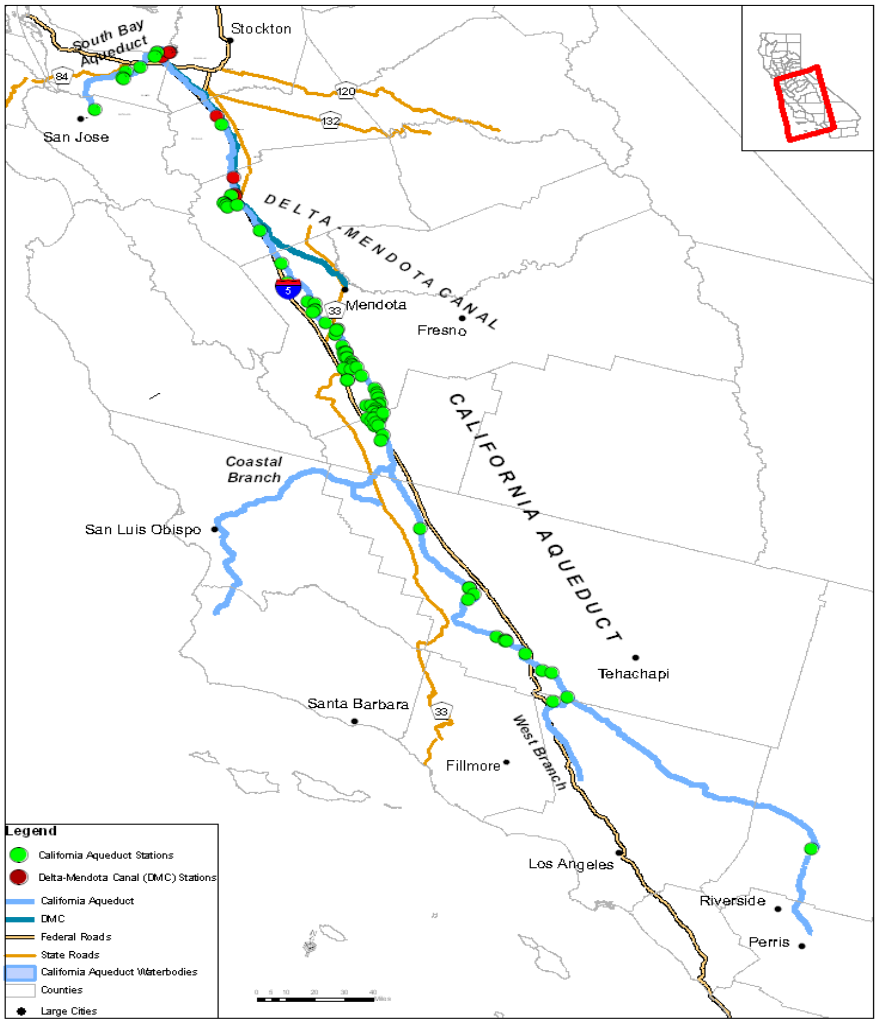
# DOC Data Locations




**Number of Data Locations**

CA Aqueduct – 106

DMC - 10

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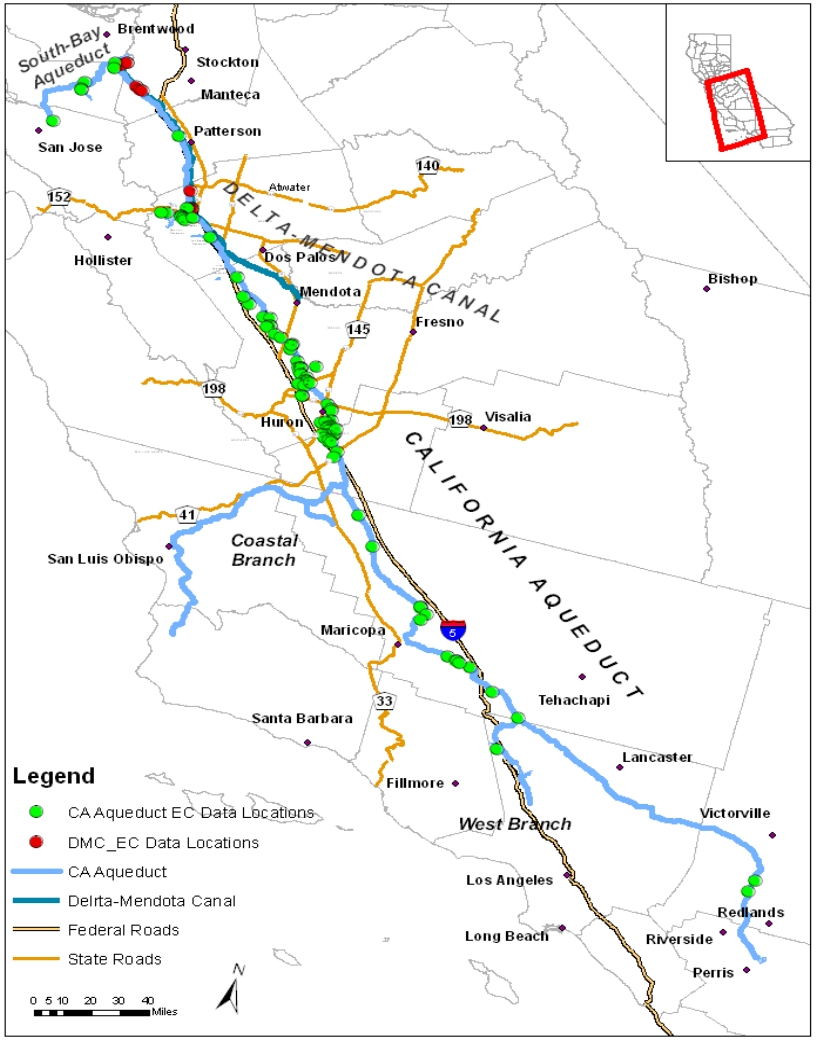
# Bromide Data Locations




**Number of Data Locations**

CA Aqueduct – 106

DMC - 11

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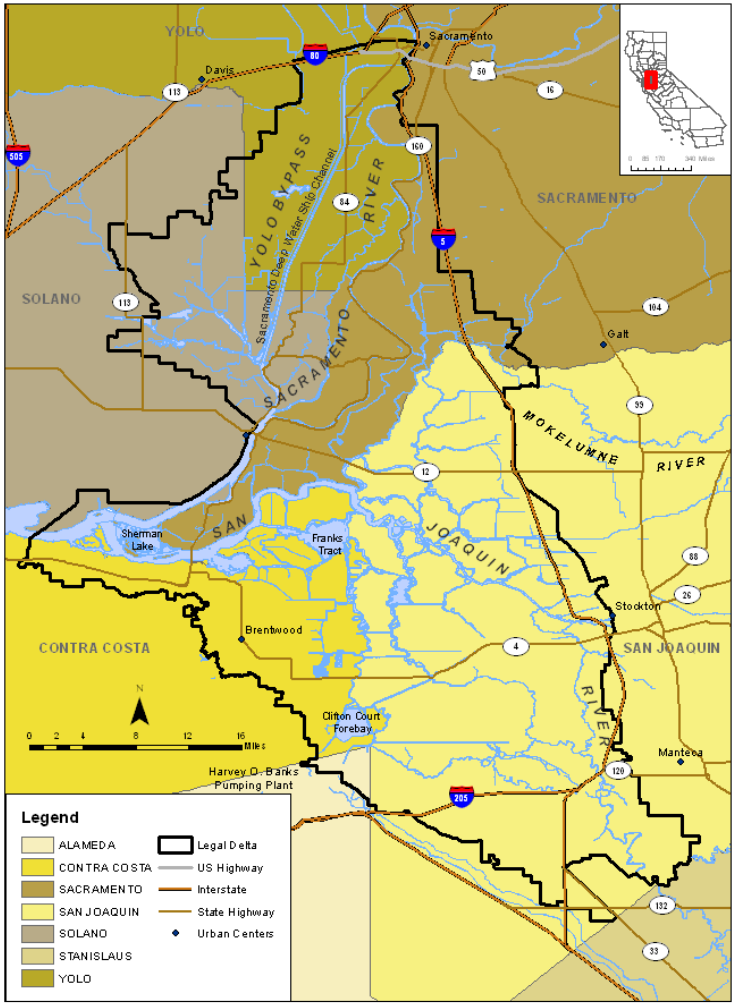
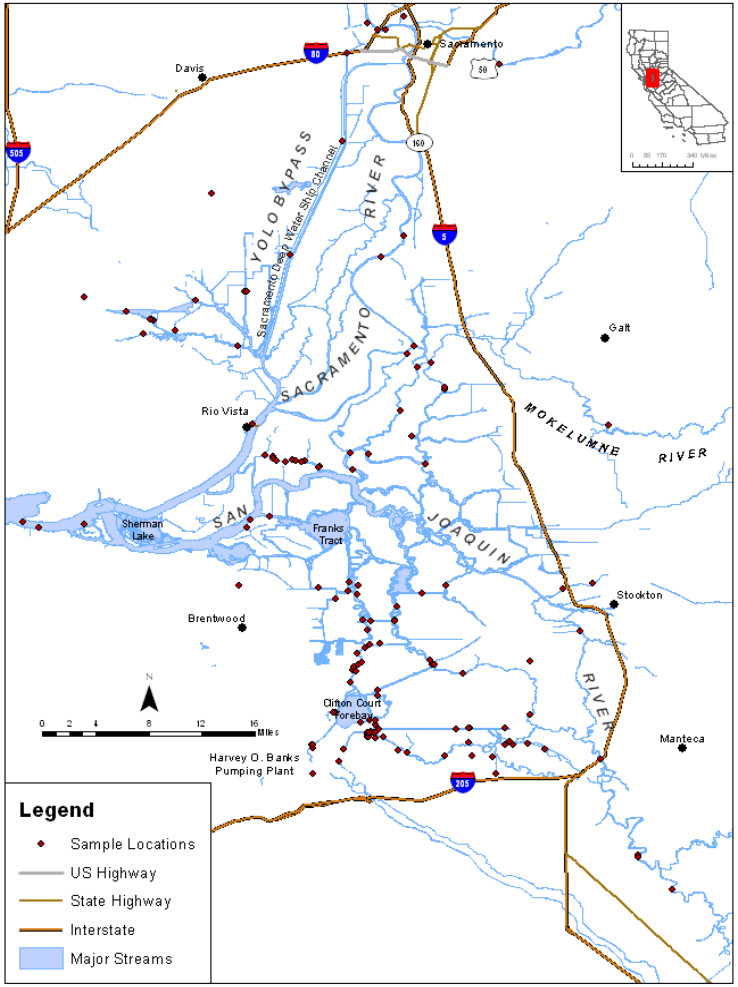
# Delta Features



# Bromide Data Locations




**Number of Data Locations**

Delta diversions and in-Delta Locations - 247

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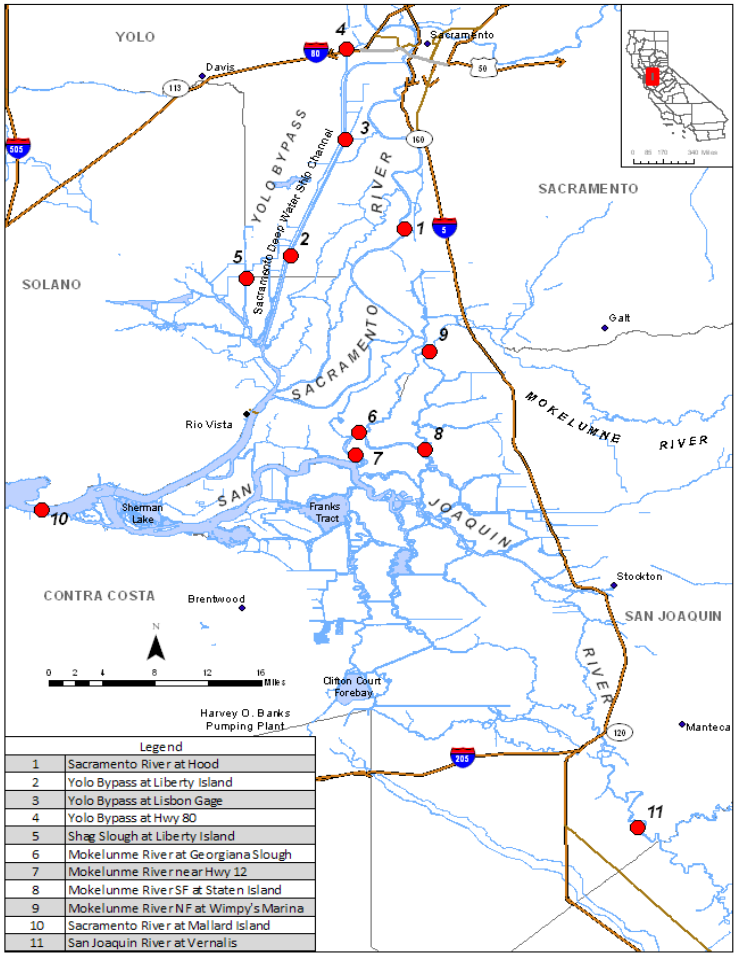
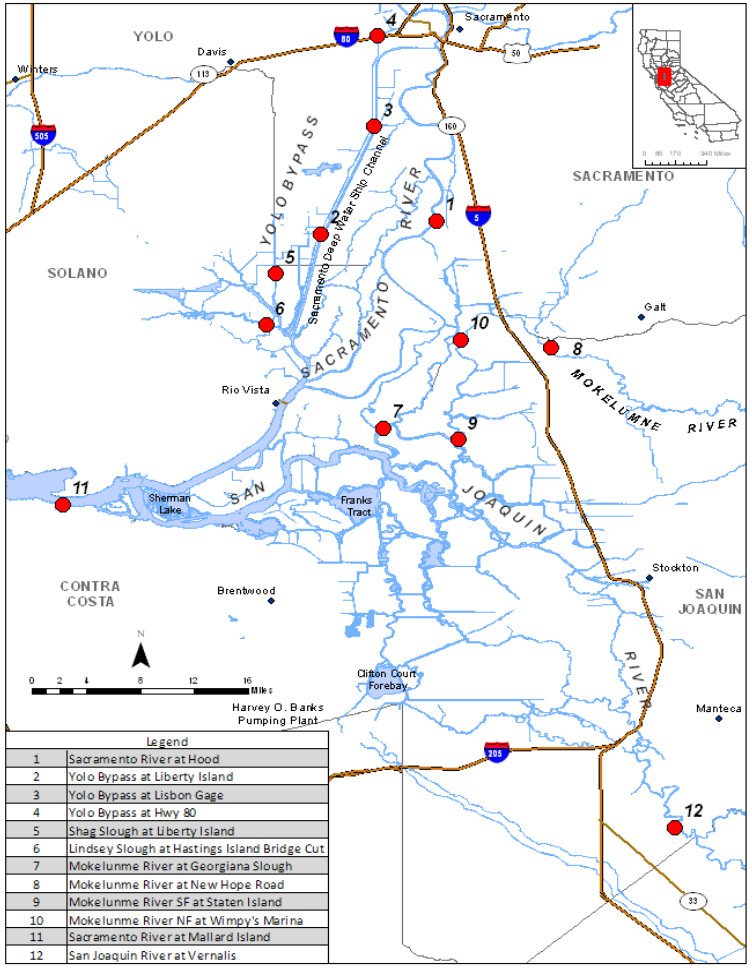
# DSM2 Bromide Data Locations




**Number of Data Locations**

Boundary Conditions - 11

# DSM 2 DOC Data Locations




**Number of Data Locations**

Boundary Conditions - 12

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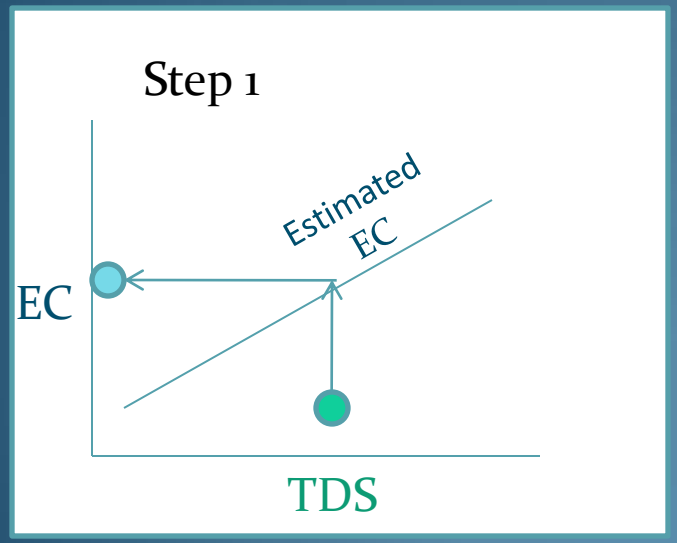
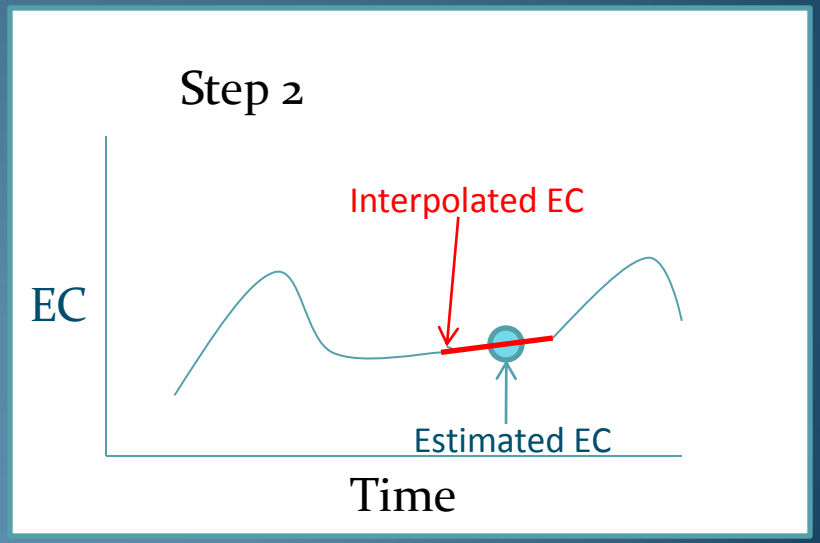
# Example of Information in Report

| *Division* | *Location ID* | *Station used to create the MWQI dataset* | *Milepost* | *Latitude/Longitude coordinates (decimal degrees)* | *Data Source* | *Frequency of data collection* | *Features* |
|---|---|---|---|---|---|---|---|
| Delta Field Division CA Aqueduct (0 to 46 miles) | 1 | Harvey O. Banks Pumping Plant | 3.04 | 37.8019N/121.6203W | CDEC: HBP WDL: KA000331 | Daily and hourly samples | Aqueduct water |
| | 2 | Delta O&M Center WTP @ MP 3.00 | 3.00 | 37.7983N/121.6199W | WDL: WKA00300 | One sample | Treated water |
| | 3 | Cal Aqu at mi 37.03, Zacharias Road | 37.03 | 37.4932N/121.2067W | WDL: KA003703 | One sample | Aqueduct water |
| Delta Field Division South Bay Aqueduct (0 to 42.89 miles) | 4 | West bank drain inlet of upstream of SBPP (Bethany Reservoir) | 0.00 | 37.7692N/121.6193W | WDL: BE000000 | One sample | Drain Inlet(Storage Facility) |
| | 5 | Del Valle Check 7 | 16.38 | 37.6547N/121.7419W | CDEC: DV7 WDL: KB001638 | Daily and hourly samples | South Bay Aqueduct water |
| | 6 | Del Valle Conserv. Outlet Works | | 37.6183N/121.7494W | WDL: DV000000 | 43 monthly samples | Storage Facility |

# Estimation of Missing EC Data

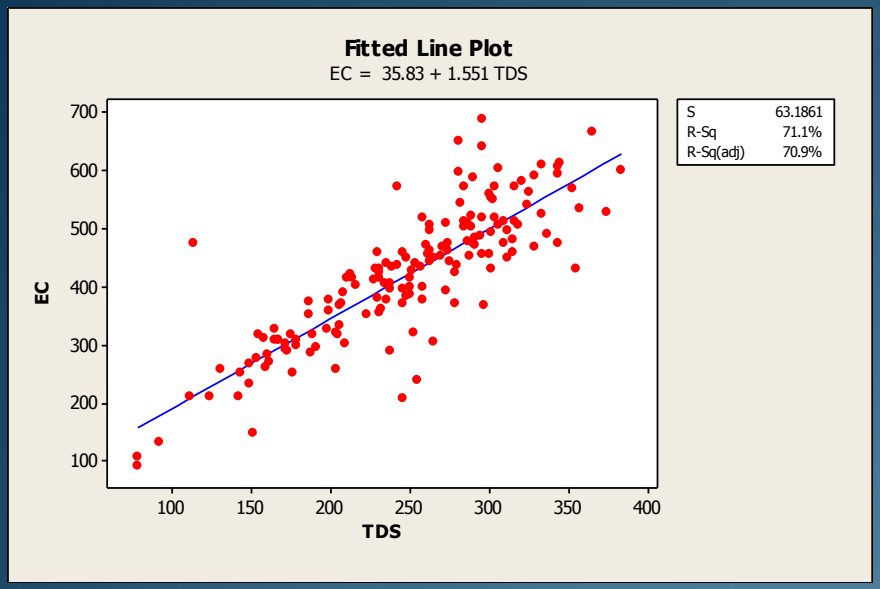
1. If Total Dissolved Solid (TDS) data was available, it was used to estimate missing EC data using a linear regression relationship.
2. For any remaining periods without EC values, linear interpolation between EC data was used to fill in missing daily values.



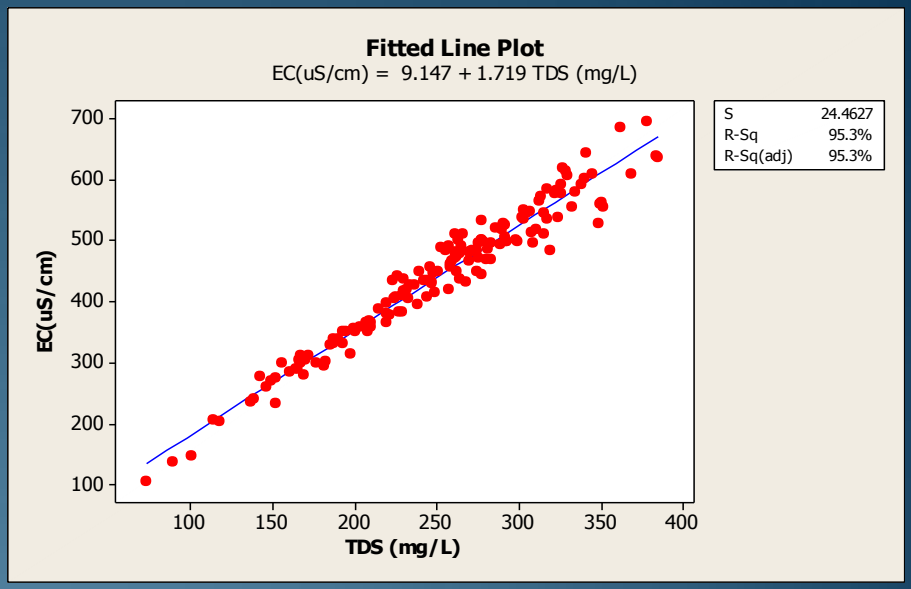



# Regression Relations for EC Data

San Joaquin Field Division



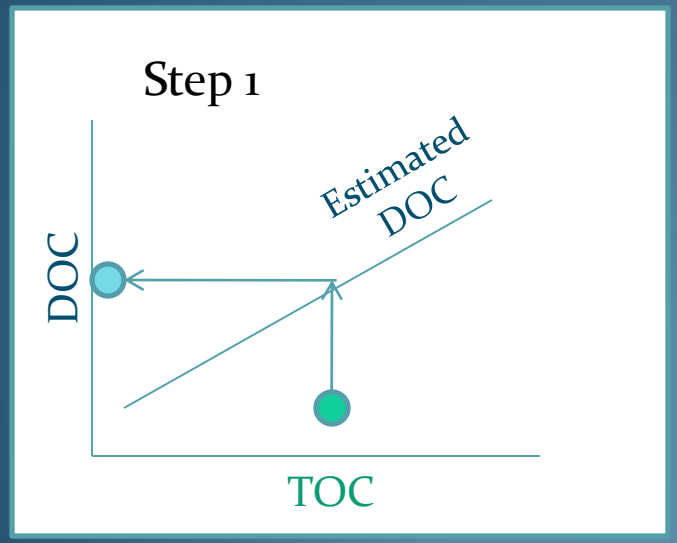

Southern Field Division

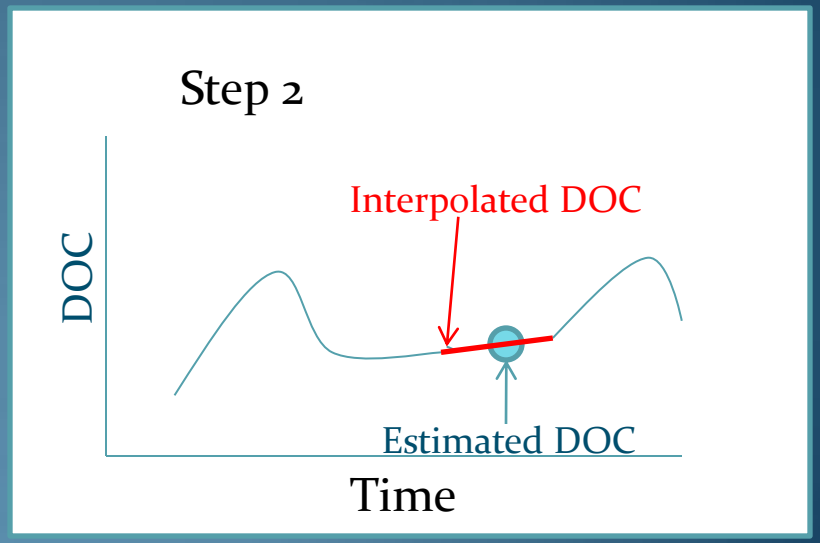



1. EC was estimated only for stations in the San Joaquin and Southern Field Divisions.
2. CDEC and/or WDL stations with long term records were used to develop the regression relationships.
3. A Mann-Whitney statistical test indicated that inflows between CDEC stations did not significantly affect the EC values between stations.

# Estimation of Missing DOC Data

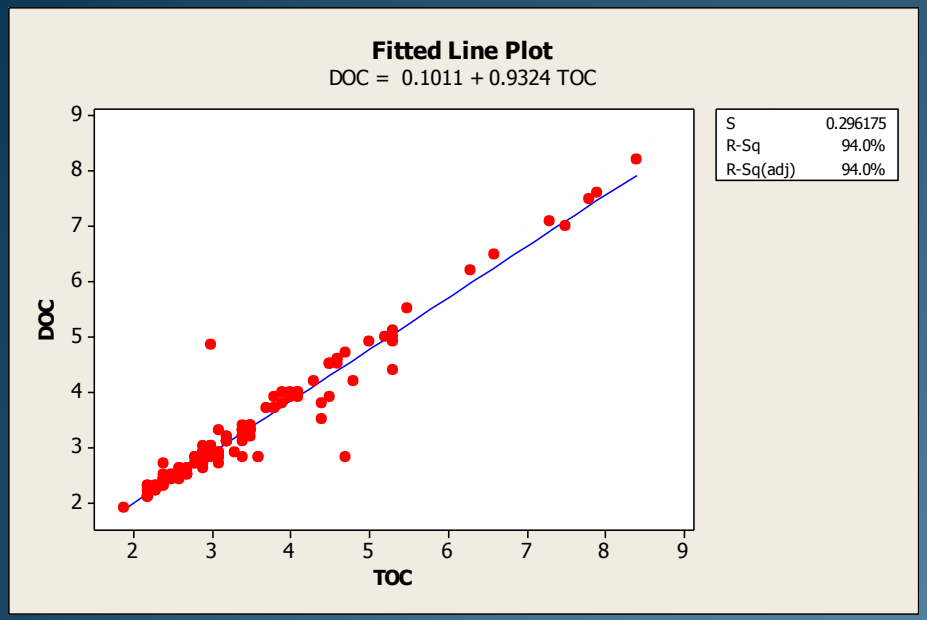
1. If Total Organic Carbon (TOC) data was available, it was used to estimate missing DOC data using a linear regression relationship.
2. For any remaining periods without DOC values, linear interpolation between DOC data was used to fill in missing daily values.



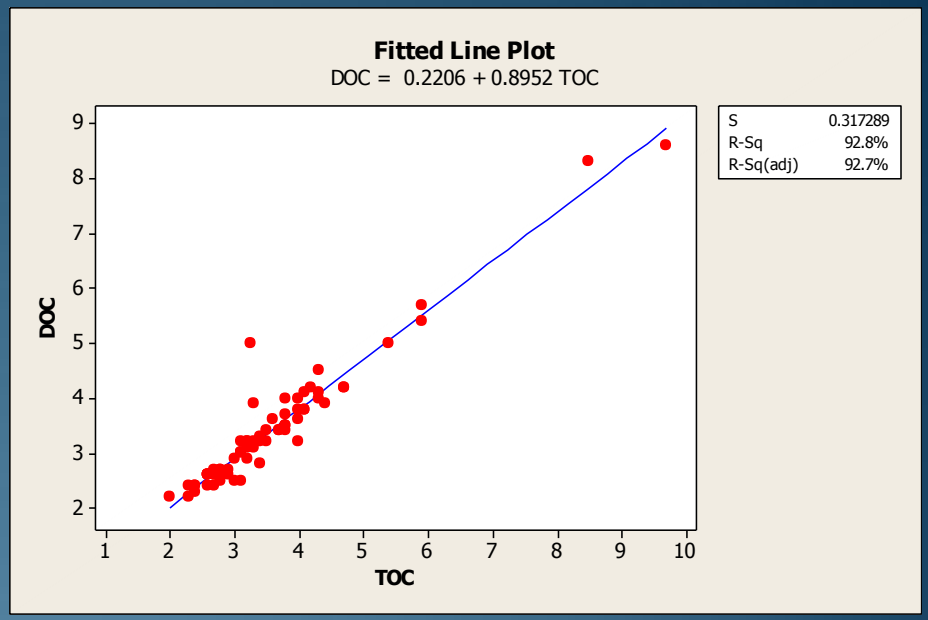



# Regression Relations for DOC Data

California Aqueduct



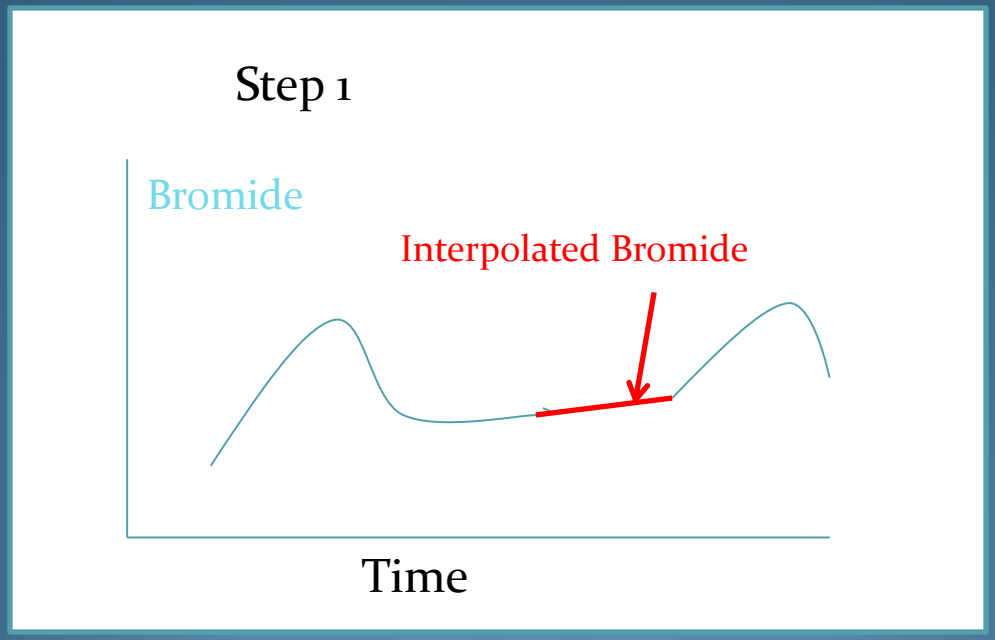

Delta-Mendota Canal




1. CDEC and WDL stations with long term records were used to develop the regression relationships.
2. A Mann-Whitney statistical test indicated that inflows between CDEC stations did not significantly affect the DOC values between stations.

# Estimation of Missing Bromide Data

1. For any periods without Bromide values, linear interpolation between Bromide data was used to fill in missing daily values.



# Acknowledgements


- DWR:
  - MWQI
    - Carol DiGiorgio
    - Ted Swift
    - Dennis Huff (consultant)
    - Jason Moore
    - Joe Christen
  - BDO
    - Bob Suits
    - Siqing Liu
  - O&M
    - Cindy Garcia
    - Doug Thompson – Delta Field Division
    - Jennifer Metcalf – San Joaquin Field Division
    - Bob Mattos – San Luis Field Division
    - John Kemp – Southern Field Division
- USBR – Chris Eacock, Stuart Angerer


# Questions?